1,165,746

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,165,746

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The Inventors of this invention in the sense of being the actual devisers thereof within the meaning of Sect 16 of the Patents Act 1949 are:— ERNST LIESER, KURT STEISSLINGER & OSWIN MAGNUS all of German nationality and of Fuggerstrasse, Stuttgart-Vachingen Friedrichshafener Strasse 6 & Stuttgard Hedelfingen, Reichenbachstrasse Stuttgart Bad Cannstatt, Germany respectively.

COMPLETE SPECIFICATION

Photographic Camera

We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America of 343 State Street, Rochester, New York 14650, United States of America (Assignees of KODAK AKTIENGESELLSCHAFT) do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a photographic camera adapted for use of roll films as well as films in cartridges or cassettes.

In most photographic cameras, the leading end of the film is secured to the take-up spool before or after insertion of the film into the camera. This process is troublesome and requires a certain amount of skill. In order to obviate this shortcoming, film magazines have been designed comprising a film supply chamber containing a film and connected to a take-up chamber for receiving the exposed film. The use of these magazines is, however, limited to particular camera models which are designed specifically for this purpose. The same applies to the employment of a cassette from which a coil of film is fed across an exposure aperture into a take-up cassette.

In our Letters Patent No. 1,123,402 there is described and claimed a photographic camera comprising a housing having an exposure plane framing means and wall means defining a pair of film chambers which are located on either side of the framing means for receiving a roll of film provided with a leader extending from the roll, and a take-up spool and wherein the take-up spool has a slot extending transversely therealong, at least a major portion of the slot lying generally parallel to the axis of rotation of said spool, the slot being open-ended and a portion of the wall means of the housing adjacent the open end of the slot being cut away such that the leader may be engaged in the spool slot by moving the leader edgewise into the slot in a direction generally axially of the spool.

In accordance with the present invention there is provided a photographic camera comprising a housing having film supply and take-up chambers located on either side of a film exposure frame for receiving a roll of film provided with a leader extending from the roll, a take-up spool rotatably mounted in the take-up chamber and having one or more slots extending transversely therealong, the slot, or each slot, having a portion extending parallel to the axis of the take-up spool and an inclined portion forming a film insertion opening in the surface of the take-up spool such that a film leader may be engaged in the spool slot by moving the film edgewise into the slot in a direction generally axially of the spool, a film feed sprocket having a radius equal to or smaller than the radius of the take-up spool and a winding mechanism coupled to the take-up spool and film sprocket, the take-up spool being coupled to the winding mechanism by means of a friction clutch, the friction of which is sufficiently great to allow a film leader projecting through the film slot to be wrapped about the core during the initial advance of the film and such that it compensates for the varying diameter of the

convolutions of the film on the core during the film winding operation and also enables the film to be rewound into the supply chamber.

In the accompanying drawings:

Fig. 1 is a perspective view of a photographic camera constructed in accordance with the invention, with the camera back open and the film feed sprocket located in the vicinity of the film supply chamber;

Fig. 2 is a perspective view of a photographic camera which is similar to that shown in Fig. 1 except that the film feed sprocket is located in the vicinity of the take-up spool; and

Fig. 3 is an axial section, to an enlarged scale, through a part of the feed sprocket shown in Fig. 2.

As illustrated a camera back 3 is pivotally mounted on a housing 1 of the camera by means of a hinge 2. In one end of the housing there is rotatably mounted in a chamber 1a, a take-up spool 4. At the other end of the housing a supply chamber 1b is provided to receive a cassette 5 for a film 6. The film 6 is guided across a film exposure frame 1c by means of conical surfaces 1d as well as in the channel provided between a pressure plate 7 carried by the camera back and area 1e surrounding the film exposure frame 1c. Camera back 3 is provided with arcuate portions 3a, extending from the pressure plate 7 to front wall 3b for a purpose hereinafter described.

As shown in Figs. 1 and 2, the take-up spool 4 is provided with one or several slots 4a for receiving the leading end 6a of the film and having insertion openings 4b disposed in spool surface 4c. The, or each, slot 4a is inclined, in the region of insertion openings 4b, towards the axis of the take-up spool 4 and then extends parallel to the axis of the take-up spool 4, the front surfaces (not shown) of slots 4a providing a guide portion for defining the position of the leading portion 6a of the film 6. The width of leading portion 6a may be scanned by means (not shown), to ascertain the film speed and thereby adjust an exposure meter and/or control system in known manner. It is also possible to control by the scanning means one or several exposure setting members, for instance for aperture and/or shutter speed.

In the embodiment illustrated in Fig. 1, a film feel sprocket 8 is disposed in the vicinity of the cassette 5 and is provided with two sprocket portions 8a whose teeth engage the peforations of the film 6. The sprocket portions 8a are rigidly secured to, or integrally formed with, the film feed sprocket 8. Take-up spool 4 and film feed sprocket 8 are connected to each other and to a winding lever 10 by means of a drive mechanism (not shown). The radius of the sprocket 8 is equal to, or smaller than, the radius of the spool 4 so that the number of revolutions made by the sprocket 8 is at least as great as that made by the spool 4 during each advance of the film. The friction of a friction clutch (not shown) between the take-up spool 4 and the winding mechanism is such that the film 6 and leading portion 6a are fastened to the spool surface 4c and the core of take-up spool 4, respectively, during the first advance movements.

A sprocket shaft 9 is axially displaceable for the purpose of rewinding to uncouple the sprocket 8 from the drive mechanism in known manner. Rotation of the take-up spool 4 in the rewind direction is allowed by the friction clutch. Upon actuation of the lever 10, the coupling between the film feed sprocket 8 and take-up spool 4 via the drive mechanism is re-established in a manner known *per se*.

The embodiment illustrated in Figs. 2 and 3 differs from the afore-described embodiment only by the design of film feed sprocket 11 and its location adjacent to take-up spool 4. This arrangement of film feed sprocket 11 which allows a simplified drive between the feed sprocket 11 and take-up spool 4 involves the risk that during rewinding the perforations of the leading portion 6a of film 6 will be displaced in an opposite direction to that of the film 6, thereby being caught in the teeth 11a of the lower sprocket portion. Rewinding could be terminated, if at all, only with the perforations of the leading end 6a being torn. However, by resiliently mounting teeth 11a, a smooth rewinding is effected. For this purpose, the teeth 11a are connected by means of leaf springs 11b to the film feed sprocket 11. Upper sprocket portion 11c with its teeth 11d is rigidly secured to or integrally formed with the film feed sprocket.

Sprocket shaft 9 is axially displaceable for the purpose of rewinding to uncouple the sprocket 11 from the drive mechanism in a manner known per se. When sprocket shaft 9 is depressed at its end 9a, against the bias of a spring 12, a portion 9b of reduced diameter is located so that the leaf springs 11b are free to move inwardly, thereby causing teeth 11a to move out of engagement with the film perforations. During this operation a pawl 14 is displaced and holds the sprocket shaft 9 in its depressed position. The rewinding operation being terminated, pawl 14 is pivoted, preferably upon opening the camera back 3, thereby releasing the sprocket shaft 9 so that the spring 12 urges the sprocket shaft 9 downwardly, thereby moving the teeth 11a into an operative position and at the same time establishing the coupling between the feed sprocket 11 and take-up spool 4.

As an alternative (not shown) the teeth 11a, or at least the lower sprocket portion, may be moved out of engagement with the per-

forations for the purpose of rewinding, by pivoting or displacing the film feel sprocket and/or lifting the film therefrom. As a further alternative (not shown), the lower sprocket portion may be replaced by a ring of rubber, a synthetic plastics material or the like which may be provided with a knurling or the like in order to increase friction, the ring effecting, in co-operation with a film roller on the camera back 3, the transport of the leading portion of the film by contacting that side of the leading portion having perforations.

For facilitating the insertion of leading portion 6a, it is expedient for the slot or slots 4a to be disposed parallel to the film track within the range of the film gate 1c and be automatically moved into said position by film 6 upon rewinding thereof. It is expedient to arrest take-up spool 4 in such position by means disposed at the camera and being controlled, for instance, by the opening movement of the camera back 3. This is, for instance, achieved by a detent which is disengaged again upon closing of camera back 3 or insertion of leading end 6a into take-up spool 4. The employement of a detent is advantageous in that even if slot or slots 4a is or are in a position unfavourable for insertion of film, for instance due to improper operation, its or their position with respect to the camera may be adjusted by rotating take-up spool 4 while the camera back 3 is open. To improve the insertion and winding process, the core of the take-up spool has a greater diameter than that of conventional spools of this type.

In the preferred embodiment, the camera back 3 is hinged to camera housing 1 at the side of spool chamber 1a receiving the exposed film, parallel to the axis of take-up spool 4. By mounting camera back 3 in a different manner, it is also possible to associate spool chamber 1a with means by which—not later than at the beginning of film winding—leading portion 6a is inserted into spool chamber 1a, either by manual operation or controlled by a process required for camera operation.

In use, a cassette 5 containing the film 6 is inserted into the cavity 1b of camera housing 1 while camera back 3 is open. Leading portion 6a of film 6 is drawn out until it projects over the opposite side of the camera housing 1 and is inserted into the take-up spool 4 through the slanted opening of a slot 4a. On closing the camera back 3, the leading portion 6a is pressed into the spool chamber 1a by means of the arcuate portions 3a which, at the same time, prevent leading portion 6a from moving under the pressure plate 7. In case of very tight insertion, leading portion 6a is, together with the film, secured to the take-up spool at the beginning of the film transport. Upon closing the camera back 3, the position of the leading portion of film is defined, the film speed determined, and the take-up spool is released, depending on the embodiment as described above. Also, in closing the back 3, film 6 which may have been laterally displaced with respect to film gate 1c, is moved into the correct position with regard to the film track by means of the pressure plate 7, assisted by the conical surfaces 1d. Upon actuation the winding lever 10 for film transport and shutter cocking, film feed sprocket 8 or 11, respectively, and take-up spool 4 are rotated in a clockwise direction (as viewed in the figures) so that leading portion 6a and film 6 are wound on to the core of take-up spool 4. The employment of film feed sprocket 8 or 11, respectively, preferably in connection with a counting mechanism, assures the correct distance between the particular exposed frames. When exposed film 6 is rewound into cassette 5, the leading portion 6a brings the slot 4a in alignment with the film track of the camera, in which position the slot may be arrested.

WHAT WE CLAIM IS:—

1. A photographic camera comprising a housing having film supply and take-up chambers located on either side of a film exposure frame for receiving a roll of film provided with a leader extending from the roll, a take-up spool rotatably mounted in the take-up chamber and having one or more slots extending transversely therealong, the slot, or each slot, having a portion extending parallel to the axis of the take-up spool and an inclined portion forming a film insertion opening in the surface of the take-up spool such that a film leader may be engaged in the spool slot by moving the film edgewise into the slot in a direction generally axially of the spool, a film feed sprocket having a radius equal to, or smaller than the radius of the take-up spool and a winding mechanism coupled to the take-up spool and film sprocket, the take-up spool being coupled to the winding mechanism by means of a friction clutch, the friction of which is sufficiently great to allow a film leader projecting through the film slot to be wrapped about the core during the initial advance of the film and such that it compensates for the varying diameter of the convolutions of the film on the core during the film winding operation and also enables the film to be rewound into the supply chamber.

2. A photographic camera according to Claim 1, wherein the film feed sprocket is uncoupled from the winding mechanism by axial displacement of a shaft on which the sprocket is mounted.

3. A photographic camera according to Claim 1 or 2, wherein the film feed sprocket is provided with two sprocket portions engaging the film perforation and whose teeth

are integrally formed with the film feed sprocket.

4. A photographic camera according to Claim 3, wherein the film feed sprocket is located close to the film supply chamber.

5. A photographic camera according to Claim 3 or 4, wherein the teeth of one of the sprocket portions of the film feed sprocket are resiliently mounted for disengagement from the film perforations.

6. A photographic camera according to Claim 1 or 2, wherein the film feed sprocket is provided with one sprocket portion having teeth for engagement with perforations along one longitudinal margin of an inserted film and a second sprocket portion comprising a ring having a friction-increasing surface which, in cooperation with a film roller on the camera back engages the other longitudinal margin of the film to advance the film.

7. A photographic camera according to any one of the preceding claims having a camera back which is pivotally mounted on the camera housing and has one or more projections which serve to press the leading end of a film projecting through the take-up spool, inwardly about the core of the spool.

8. Photographic cameras according to Claim 1, constructed substantially as herein before described with reference to, and as shown in, the accompanying drawings.

L. A. TRANGMAR, BSc. CPA,
Agent for the Applicants.

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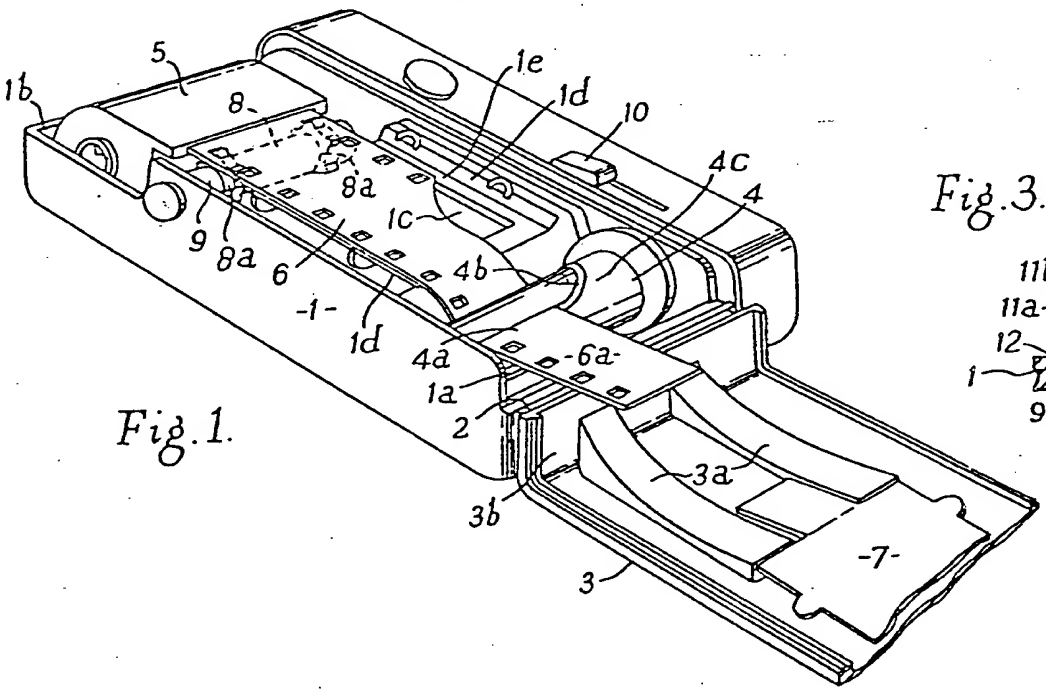

5
1b
8
1e
1d
10
4c
4
8a
1c
9
8a
6
4b
-1-
1d
4a
-6a-
1a
2
3a
3b
-7-
3

Fig.1.

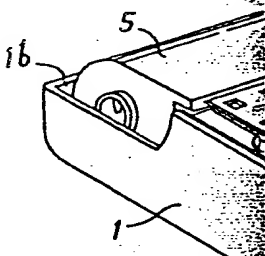
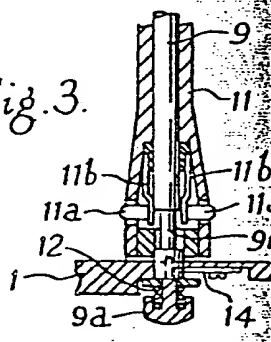

5
1b
1

Fig.3.


9
11
11b
11b
11a
11
12
9
1
9a
14

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1 SHEET This drawing is a reproduction of the Original on a reduced scale

Fig. 2.

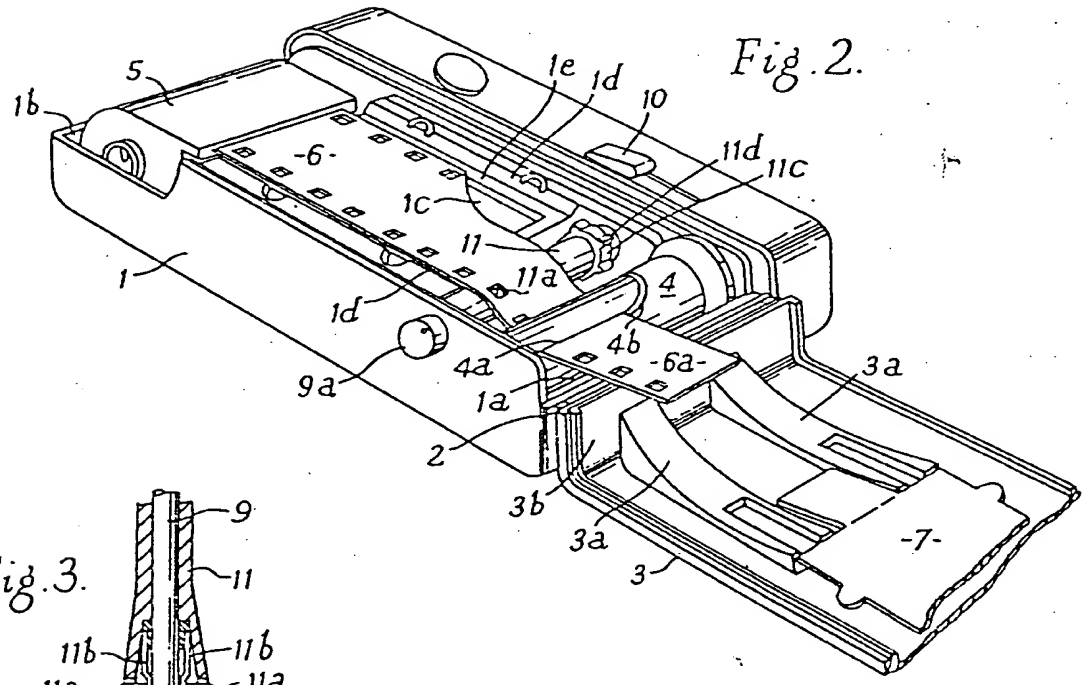

Fig. 3.